

Effectiveness of Training Among Food Handlers: A Review on the Mauritian Framework

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ABSTRACT

Food handlers are crucial links in the food chain from farm to fork. The safety of our food depends largely on them. However, malpractices have been reported on numerous occasions resulting in food poisoning outbreaks. Therefore it is essential that food handlers are properly trained so that they take the necessary precautions to avoid such accidents. The current review analyses the Mauritian model of food handlers training which is mandatory according to the Food Regulations (1999). Although the present model is accessible to the general public as it regionalised and free of charge, there are several weaknesses such as absence of continuous education, no targeted modules and assessment. It is important that these issues be addressed in order to improve the effectiveness of this model. This review also addresses the importance of the food handlers training, conflicting views about the efficiency of training staff to improve food safety practices and provides a critical appraisal of its importance.

Key words: Training, Food handlers, Food safety, Foodborne diseases.

INTRODUCTION

A study on food poisoning cases reported that food handlers are responsible for foodborne disease outbreaks for the past years and there is no indication that this is diminishing (Greig *et al.*, 2007). Unsafe food has been a human health problem since history was first recorded, and many food safety problems encountered are not new. Although governments all over the world are doing their best to improve the safety of the food supply, the occurrence of foodborne disease remains a significant health issue in both developed and developing countries (WHO, 2006). According to the World Health Organisation (WHO), in 2005 alone, 1.8 million people died from diarrhoeal diseases and most of these cases can be attributed to contaminated food or water. In 2009, 27,037 notifications of 9 diseases or conditions that are commonly transmitted by food have been reported

in Australia (The OzFoodNet Working Group, 2009). In Europe, there has also been a marked increase in reported food poisoning cases. In 2009 there were 212,064 human cases of campylobacteriosis as compared to 99,020 cases of salmonellosis (Eurosurveillance editorial team, 2010). Proper food preparation can prevent most foodborne diseases. The WHO has long been aware of the need to train food handlers about their responsibilities for food safety. In the early 1990s, WHO developed the Ten Golden Rules for Safer Food Preparation which was replaced in 2001 by the Five Keys to Safer Food, a global health message which explains the basic principles that each individual should know all over the world to ensure safe food handling practices and prevent foodborne diseases. The Five Keys to Safer Food, and associated training materials, were developed to provide countries with materials that are easy to use, reproduce and adapt to different target audiences (WHO, 2006).

A survey among food handlers in Bangkok concluded that food handlers should attend proper training in the basic principle of food safety and rules of personal hygiene in order to improve their practices in food handling (Cuprasitrut *et al.*, 2011). However, on the other hand studies have highlighted that food safety training alone was not sufficient to improve hygiene attitude and practices of food handlers (Chang *et al.*, 2003; Walker *et al.*, 2003).

Training of managers, supervisors and all people who can influence the safety of food is essential to reduce the unacceptable high levels of food poisoning. According to Sprenger (2009), training is intended to modify or develop knowledge, skills and attitude through learning experience and to achieve effective performance in an activity or range of activities. However, the emphasis on classroom-based, foundation courses and certification in isolation has not been particularly successful in reducing levels of food poisoning. The main reason for this is the belief that ignorance is the main reason for food poisoning (Sprenger, 2009). This observation is supported by a study carried out in Iran, where it was found that half of the food handlers interviewed were not aware that *Salmonella*, *Staphylococcus* and Hepatitis A & B viruses and are major causal agents of food-borne diseases (Ansari-lari *et al.*, 2010). It is important for food safety training course to include both theory and practical (Rennie, 1994; Taylor, 1996). The theory part usually englobes core messages such as cleaning, cross-contamination, adequate cooking, temperature control and use of safe water and raw materials (WHO, 2006), whereas the practical part should include aspects such as hand washing which has been demonstrated to reduce the risk of diarrhoea diseases (Xavier *et al.*, 2007).

Furthermore, it is assumed that if food handlers are aware of their legal obligations and they are provided with the knowledge and understanding on the prevention of food poisoning, this will automatically result in the implementation of good hygiene practices (Sprenger, 2009). In fact there is limited evidence that food handlers training, whether mandatory or not, improves food safety practices of food handlers working in food premises, and limited evidence that it enhances knowledge

or behaviour (Pajot and Aubin, 2011)

The objectives of this review are to:

- 1) provide an overview of the food handler's training programme in Mauritius;
- 2) critically analyse the effectiveness of the actual food handler's training; and
- 3) recommend correctives measures to improve the present model.

Current prevalence of foodborne diseases in Mauritius

Foodborne diseases have been increasing in recent years, with a greater impact on the health and economy of developing countries (WHO, 2002). Mauritius is not spared from such threats. This is confirmed by the general ascending trend in the number of domestic and commercial reported food poisoning cases for the past twenty years (Health statistics report, 2011) as shown in Table 1 and Figure 1, with sporadic peaks which are more frequent in the last few years, putting our health services under pressure.

In fact, the peaks were due to episodes of mass food poisoning caused mostly by the consumption of contaminated chicken '*kebab*' containing mayonnaise and cream filled pastries. This increase may be partly attributed to improved surveillance (Griffith *et al.*, 1995; Kaferstein and Abdussalam, 1999) but may equally reflect increased global trade and travel, changes in modern food production, the impact of modern life styles, changes in food consumption and the emergence of new pathogens (Collins, 1997; Tauxe, 1997). In addition, food poisoning cases are mostly caused by human handling errors (Ehiri & Morris, 1996; Greig *et al.*, 2007; Howes *et al.*, 1996) or poor handling practices (Djuretic *et al.*, 1996; Evans *et al.*, 1998). In fact, the inappropriate handling of foods by the food service industry has been implicated in 97% of food poisoning cases (Greig *et al.*, 2007; Howes *et al.*, 1996). Foodborne illnesses typically involve cross-contamination of raw and cooked foodstuff, inadequate cooking, and storage at inappropriate temperatures as well as asymptomatic carriers of food poisoning organisms (Cruickshank, 1990). Consequently, food becomes contaminated, pathogenic bacteria are provided with the opportunity to multiply or they survive

inadequate cooking or processing (Sprenger, 2009).

The current scenario of the food producing sector in Mauritius relies heavily on a multiplicity of independently managed operations namely growing, breeding, transport by air or sea, transshipment, land transport, storage, processing, repackaging, distribution, sale at wholesale and retail levels and cooking for sale. Each of these operations is developing into areas of business activity, embracing an ever-increasing number of operators. Aided by the present policy of promoting self-employment, Mauritian Government has

encouraged the establishment and expansion of family-run businesses in each of these areas of activity. Competition to maximise revenue and reduce costs have driven operators to continually explore means to avoiding control and supervision. This coincides with the lack of resources and manpower available to agencies responsible for the function of inspecting and analysing food items on sale to the public (NESC, 2010).

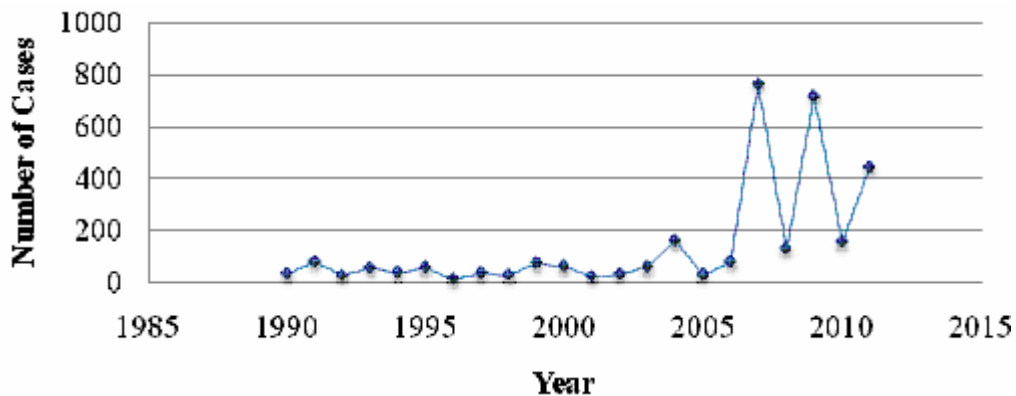
Overview of the Mauritian framework of food handlers training

Prior to 1998, all persons engaged in the handling of food were required under the

Table 1: Reported food poisoning cases from 1990 to 2011

Year	Reported food poisoning cases	Year	Reported food poisoning cases
1990	32	2001	23
1991	78	2002	33
1992	27	2003	60
1993	57	2004	160
1994	39	2005	29
1995	57	2006	78
1996	13	2007	766
1997	35	2008	129
1998	28	2009	718
1999	73	2010	156
2000	62	2011	445

Source: Health Statistics Report 2011-Ministry of Health and Quality of Life



Source: Health Statistics Report 2011-Ministry of Health and Quality of Life.

Fig. 1: Food poisoning trend from 1990 to 2011.

“Tuberculosis Regulations 1926” to be in possession of a medical certificate delivered by a Government Medical Officer appointed by the Permanent Secretary of the Ministry of Health stating that he is free from Tuberculosis (Section 4). However, with the advent of the Food Act (1998), food handlers are now required, in addition to medical examination, to follow a food hygiene training course approved by the Permanent Secretary of the Ministry of Health and Quality of Life to obtain a Food Handler’s Certificate issued by a Government Medical Officer (Section 47 of the Food Regulations (1999)). The motivations for the change in policy were to modernise and consolidate the law related to the quality of food (Food Act, 1998). The certificate is valid for one year and shall be renewed for two additional years after which the food handler need to apply for a new one without having to undergo the training course again but medical examination only.

To obtain a Food Handler’s Certificate for the first time, a person needs to apply to the nearest Regional Health Office by submitting his/her particulars together with two passport size photographs. An appointment is given to him/her for the training course and medical examination. Usually the applicants have to attend to lectures delivered in a venue of the office. However, for large organisations such as hotels, supermarkets, hypermarkets or food processing plants where the populations of food handlers are important, training courses are delivered on site in order not to disrupt the activities of the operators. Specific tasks undertaken and knowledge in food hygiene is the same for all categories of food handlers irrespective whether they deal with raw, ready to eat, high risk or low risk food. All the services related to the Food Handler’s Certificate are offered free of charge by the Ministry of Health and Quality of Life.

Training course approved by the Permanent Secretary of the Ministry of Health and Quality of Life is also run by private individuals and organisations, but against payment. However, issue of the Food Handler’s Certificate is only done by Government Medical Officers of the Ministry of Health and Quality of Life. According to records available at the Ministry of Health and Quality of Life, 21,344 Food Handler’s Certificates have been issued in 2012.

Importance, benefit and effectiveness of training in food safety and hygiene

Having recognized that the objective of food safety training is to provide competent food handlers who continuously produce safe food, management must be convinced of the importance and benefit of training to provide the necessary resources. Training should be considered as an investment in the future and evidence is available to show that companies providing high levels of training usually have better growth and profits. Food safety remains a critical issue with outbreaks of foodborne illness resulting in substantial costs to individuals, the food industry and the economy (Kaferstein *et al.*, 1997). Such training should contribute significantly to the profitability of a food business by assisting in the production of safe food, safeguarding the quality of the product and reducing food wastage. Training is necessary to enable staff to fulfil their potential by understanding their responsibilities and improving their skills.

Hygiene training of staff should stress the importance of hygiene to the commercial viability of the organisation and how a food poisoning incident or serious food complaint is likely to affect them. Training also helps to promote confidence, increase job satisfaction, improve performance/morale and supervisory skills of managers, generate pride in appearance and practices, develop team spirit, and reduce the amount of supervision required; reducing complaint, increasing job satisfaction and probably reducing staff turnover are equally essential. Moreover, training contributes to increase productivity, promotes a good company image as well as ensures that all the correct procedures, including cleaning, are followed so as to comply with any legal provisions or the requirements of industry guides or codes of practice. Through training the food industry will benefit by having available a pool of trained food handlers. It has been reported that when selecting restaurants, customers increasingly perceived hygiene as a critical determinant (Park *et al.*, 2010) and owners of restaurants highlighted that food quality and hygiene are considered as key factors in the profitability of the food business (Yoon and Moon, 2003). On the other hand the Food Standards Agency (FSA) and Health Protection Agency (HPA) estimated that in England and Wales

economic loss due to food-borne diseases amounted to approximately ≤ 1.4 billion, with 765,000 cases recorded (FSA, 2006).

Food handler training is seen as one strategy whereby food safety can be increased, offering long-term benefits to the food industry (Smith, 1994). A study to evaluate knowledge, attitudes, and behavior concerning foodborne diseases and food safety issues among food handlers in Italy demonstrated that the level of knowledge was higher among those who attended training courses in food safety (Angelillo, 2000). Effective food safety training involves two stages. Firstly the provision of knowledge in a way that develops understanding and a positive attitude, for example, the importance of hand washing and the knowledge when to wash the hands. In fact, hand washing has proved to reduce contamination significantly (Bidawid *et al.*, 2000) compared to glove wearing where a study has reported that such practice failed to reduce bacterial contamination due to protracted period and complacency (Lynch *et al.*, 2005). However, combining the use of gloves with proper hand washing can reduce the risk of cross contamination (Montville *et al.*, 2001). The second stage involves the implementation of the knowledge by washing the hands properly when required. Practice, motivation and effective supervision, especially coaching, should result in the objective being achieved, i.e. the competency of the food handler and implementation of good practice at all times (Sprenger, 2009).

Critical appraisal of the effectiveness of the Mauritian food handler's training framework

In Mauritius, it is mandatory for food handlers to follow a food hygiene training course. Several studies have attempted to evaluate the effectiveness of food safety training on practices in foodservice establishments and resulted in divergent arguments. A study on the effectiveness of an in-house food safety programme among mid-level managers and food handlers in large catering establishment showed that food safety training improved microbiological quality of food (Cohen *et al.*, 2001). Other studies established that inspection score improved after staff were trained in food safety (Cotterchio *et al.*, 1998; Kneller & Bierma, 1990; Mathias *et al.*, 1995). Cotterchio *et al.* (1998)

demonstrated that a year after the training, the mean inspection score increased by 14.7 points among 23 restaurants in Boston. On the other hand studies found that there was no or insignificant change in inspection score after food handlers were trained (Cassey & Cook, 1979; Mathias *et al.*, 1994 and Wright & Feun, 1986). Although there is evidence that food safety training is effective at enhancing knowledge (Park *et al.*, 2010), the latter does not always improve practices (Howes *et al.*, 1996). Therefore the legal obligation for food handlers to be trained in food safety is not a guarantee that they are going to deliver safe food to the public.

A study among restaurant staff in Korea demonstrated that food hygiene training significantly improved knowledge and so practicing continual and repetitive food hygiene training could be effective in improving knowledge further and even practices (Park *et al.*, 2010). However this observation contrasts sharply with the Mauritian framework where food handlers are required to undergo food hygiene training course only once in their career, that is when they start to work in the food sector. Such a procedure defeats the purpose of ensuring safe food to the population as education must be continuous in order to be successful (Hinkin, 2000).

In the Mauritian model of food safety training course, the content of the modules is the same for all categories of food handlers irrespective whether they deal with raw, ready to eat, high risk or low risk food. According to the World Health Organisation - Europe (Fact sheet Copenhagen and Parma, 2010), infections with *Salmonella spp.* rise by 5-10% for each one-degree increase in weekly temperature, at ambient temperature above 5°C due to climate change. Actually food poisoning outbreaks involving *Salmonella* seem to be on the rise in recent decades (Greig *et al.*, 2007). It is estimated that 93.8 million cases of gastroenteritis due to *Salmonella* species occur globally each year, among which approximately 80.3 million is of foodborne origin and resulting in 155,000 deaths (Majowicz *et al.*, 2010). It is reported that raw poultry and eggs, whether on the shell or internally, can be contaminated with *Salmonella* and this represents potential cause of foodborne outbreaks (Gómez-Aldapa *et al.*, 2012). In 2012, Mauritius had a

population around 1.3 million and the consumption of eggs and chicken per inhabitant was estimated at 6.86 kg/year and 35.7 kg/year respectively. The average monthly household disposable income increased by 53.9% from USD 615 (Rs 19,080) in 2006/07 to USD 947 (Rs 29,360) in 2012 where the largest broad category of household expenditure remained 'Food and non-alcoholic beverages' accounting for 27.3% of total household consumption expenditure in 2012 (USD 211 (Rs 6,540) per month) compared to 28.5% in 2006/07 (USD 145 (Rs 4,500) per month) (Statistics Mauritius, 2012). In Mauritius food poisoning cases increased drastically over the past ten years (Table 1 and Figure 1). In 2008, 53 cases of *Salmonella* were reported in one episode of food poisoning after ingestion of contaminated egg- containing food namely "*Marlin mousse*" (Issack *et al.*, 2009). However, much of the risk posed by *Salmonella* can be mitigated through proper handling and correct food safety practices (Gómez-Aldapa *et al.*, 2012) and so it is important that food safety training courses be tailor-made to target specific audience which are more liable to cause *Salmonella* food poisoning.

In the Mauritian model, no provision has been made for assessment of the food handlers after the training course. Certification is based according to the attendance of the participants. However, evaluation is integral to the cycle of training, providing feedback on the effectiveness of the method used, checking the achievement of the objectives set by both the trainer and trainee and assessing whether the needs originally

identified have been met (Bramley, 1996Aa study among food handlers in Brazil concluded that training course should include an evaluation process to ensure its effectiveness (Soares *et al.*, 2012).

Conclusion and Recommendations

Although there are diverging opinions about the impact of food hygiene training course on practices, there is a consensus that it improves knowledge. The Mauritian model provides the opportunity for everyone involved in food activities to have access freely to such education. However the actual model is incomplete in the sense that some components are missing such as continuous education, assessment and targeted modules, although enforcement plays an important role in compelling food handlers to put into practice what they have learnt.

Therefore in order to improve the efficiency of food handler training model it is recommended to:

- Make it mandatory for food handler to undergo a refresher food safety training course prior to renewal of their Food Handler's Certificate after its expiry after 3 years.
- Assess the food handlers before issuing the certificate in order to evaluate the knowledge retained after the training course.
- Train food handlers according to their need and risk which the food may represent to consumers in terms of food poisoning.

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